SYNOPSIS

Proposed Title: Multi-Soliton Interaction in Plasmas

Submitted by

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keywords: Ion acoustic wave, Solitary Wave, Superthermal Plasma, Trapped electrons, Applied periodic force.

Nonlinear waves, quasi periodicity and chaos in Plasma The aim of the present research is to investigate the existence and to study the important properties of various kinds of nonlinear structures in different plasma models. Solitary waves, Shocks, vortices, solitary vortices will be studied along with quasiperiodicity and chaos. The special emphasis will be given in its application to dense astrophysical environments. Wave phenomena in ordinary plasmas are mostly studied by hydrodynamic approach. But when the number density of different species become so large that the Fermi temperature exceeds the system temperature, the quantum effects become important. The Wigner representation is a useful tool to express quantum mechanical effects in a phase space formalism and applying the same one can obtain the quantum correction to the fluid equations for plasmas which are known as quantum hydrodynamic (QHD) equations. Using HD model we shall study nonlinear structures like solitons, dressed solitons, shocks, vortices in different plasma models. The study will be extended to see the quasiperiodicity and chaos in presence of externally applied force. The most important aspect would be to replace the basic plasma fluid equations (Equation of continuity, Momentum Balance etc.) as a dynamical system.

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